GG250 Lab 10
Finding a Needle in a Haystack

Exercise 8a **(20 pts total)**
Write a function that returns the "one-dimensional" index (q) of an element in a 3-D array given the following input parameters: the row (i), column (j), and layer (k) of the element, and the number of rows (l), columns (m), and layers (n) in the 3-D matrix. The following table (for a 2x4x3 matrix) might help, as should slide 10-3 of the lab 10 lecture:

i	j	k	q
1	1	1	1
2	1	1	2
1	2	1	3
2	2	1	4
1	3	1	5
2	3	1	6
1	4	1	7
2	4	1	8
1	1	2	9
2	1	2	10
1	2	2	11
2	2	2	12
1	3	2	13
2	3	2	14
1	4	2	15
2	4	2	16
1	1	3	17
2	1	3	18
1	2	3	19
2	2	3	20
1	3	3	21
2	3	3	22
1	4	3	23
2	4	3	24

Exercise 8b **(20 pts total)**
Write a function that returns the row (i), column (j), and layer (k) of an element in a 3-D matrix given following input parameters: the index of the element (q), and the number of rows (l), columns (m), and layers (n) in the matrix. **CHECK YOUR RESULTS!**

Exercise 8c **(20 pts total)**
Write a function that generates and searches a 3-D matrix of random numbers between zero and one, and returns the following 6 items: the matrix (a); the smallest value (" the

needle") in the matrix (a_min); the index (q) of a_min; and the row (i), column (j), and layer (k) of a_min.